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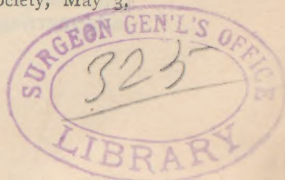
NOTES ON THE CAUSE AND TREATMENT OF FUNCTIONAL INSOMNIA.¹

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DURING the past years I have felt a deep interest in that large number of cases of morbid sleeplessness occurring in persons of the neurasthenic habit. I am not concerned with cases of sleeplessness due to other causes, to gross lesions of the brain, incipient insanity, the many acute febrile conditions, nor with wakefulness due to pain.

Allowing for the intentional or unintentional deception in such matters, we still meet with a very large number of persons who may complain of this or that symptom of cerebral or of spinal neurasthenia, but whose chief trouble is insomnia pure and simple. This insomnia may imply mere restless sleep, a sleep of only two or three hours a night, or absolute sleeplessness. And I speak of neurasthenic rather than hysterical insomnia, because I find that really hysterical persons are not so apt to be sufferers from true insomnia, and by far the greatest majority of my cases occurred in men and women

¹ Read before the New York Neurological Society, May 3, 1887.



who could not be accused of the hysterical taint. First, a few typical cases.

Mr. L., aged thirty-four. Educated as engineer, now designer in a large house-decorating firm, consulted me for the first time, nearly eighteen months ago, on account of protracted spells of insomnia. In answer to my questions, he stated that he would sleep tolerably well for a few nights in succession and would then lie awake night after night for weeks. He claimed not to sleep at all during these times, to feel languid and tired in the morning, and as his mind was very actively engaged during the day, he felt completely exhausted. This his looks showed, and, indeed, the marvel was that the man accomplished as much as in reality he did. When asked what kept him awake, whether he thought of his business affairs and so on, he stated that he had no reason to worry about them, and if he did think these matters over, it was simply that he had to busy his mind in some way while lying awake. Headaches were not frequent, but he complained of characteristic pressure on the top of the head. Knee-jerks normal, no tremors of the fingers, no cardiac trouble, but feeble heart beat and weak pulse. Up to this time the patient had been leading a very irregular life, working till late at night, taking his meals whenever it suited his conveniences, and enjoying but little out-door exercise. His entire mode of life was regulated in a way that we shall discuss later on ; he was given some hypnotics at the start, these were soon withdrawn, and every thing went well for a period of three months, when he lapsed back into some of his old habits, and again began to suffer from insomnia. From this time on until about six months ago, periods of sound sleep alternated with periods of insomnia. By consent of the patient every form of hypnotic medication was abandoned ; massage, electricity, and active exercise were chiefly relied upon.

About six months ago the patient became engaged, and two months later he married. Both engagement and marriage were taken in a matter-of-fact way and

seemed to exercise very little influence for good or bad. A few weeks after his marriage were spent in Florida, where the enervating climate and the absolute lack of regular employment exercised a very deleterious influence. "As long as I was in Florida," the patient told me, "I did not close an eye," and this statement his wife corroborated. Since his return to this city, to his regular occupation, and to absolute regularity in his mode of life, including various forms of active exercise, riding, bowling, and the like, he has been sleeping soundly and feels better than ever before. The case illustrates the worthlessness of hypnotic medication and the importance of attending to matters of general regime.

Another case is that of Mr. J. H., æt. twenty-nine, a man of very nervous disposition, easily excitable, and easily depressed in spirits. For the past year he has been greatly distressed by sleeplessness; sleeping but a few hours each night and then very restlessly. He is a man of rather slim physique, but no demonstrable organic changes of any sort. Pulse small and heart beat weak, has occasional asthmatic attacks at night. No headaches. Habits good at present, somewhat doubtful as to past. Knee-jerks exaggerated. As he consulted me during the summer months, I did not waste time with hypnotics and spinal tonics, but sent him to the Adirondacks at once, giving him full directions (in accordance with the maxims of Oertel) as to quality and quantity of exercise he was to take. Since that time he has not been troubled with insomnia.

Mr. W. J. K., æt. thirty, was also a sufferer from insomnia, which was brought on by over-work and worry over his father's illness and death some months previously. All neurasthenic symptoms, including exaggeration of knee-jerks. Insomnia relieved by amorphous hyoscyamia given first four nights, and by change to country air with same directions as other patient.

If we are to gain an insight into the causes of this form of functional insomnia, it will be well for us to note how and what little is known regard-

ing the conditions of normal sleep. I am aware that little or nothing is known of the organic basis of neurasthenia, and it may seem useless, therefore, to attempt to reason about the causation of one of its symptoms. Let us see, however, what physiologists have done to aid us in arguing this question.

The physiological theories regarding sleep are legion in number, a few facts only are undeniable. The first that the abolition of peripheral sensations makes for sleep. We need not depend upon the once famous example, communicated by Strümpell,¹ that has gone the round of all the monographs and textbooks, of the boy who could receive impressions from the outer world through his right eye and left ear only, and who fell asleep as soon as both these media were occluded. All of us know that when we are once in bed, the absolute quiet of night, and utter darkness of the room, are most conducive to sleep, and that if there be no noise or light in the room we can fall asleep, provided that other mighty factor in the case, fatigue—be in the ascendant. We know, too, that in the absence of actual peripheral stimuli we can project cortical activity to the periphery, and thus actually engender a state of wakefulness. Before the suspension or withdrawal of actual peripheral sensations it is of the very greatest importance that the cortex should be at rest.

Reasoning by analogy from muscular fatigue, Obersteiner,² Preyer,³ and others have supposed that during mental activity, acid products are formed in the cerebral tissues, and that as soon as a sufficient

¹ Strümpell: *Deutsch. Arch. f. kl. Med.*, xxii.

² Obersteiner: *Zur Theorie des Schlafes. Ztschr. f. Psych.*, xxix.

³ Preyer: *Ueber die Ursahend. Schlafes. Stuttgart, 1877.*

quantity of this is on hand sleep supervenes. Preyer has even gone so far as to suppose that lactic acid is the product of nerve fatigue as it is of muscular fatigue. There are, to my knowledge, no facts in corroboration of this view. A more ingenious suggestion has been advanced by Pflüger in his *Archives* for 1875, p. 468. He argues that cortical activity can only be maintained by the proper oxygenation of cortical tissue. When this supply of intramolecular oxygen is exhausted, or if the supply cannot be promptly renewed, sleep supervenes. The supply of oxygen is, of course, effected through the blood. On this theory, too, sleep might be the result of an insufficient supply of blood-oxygen, or there might be some peculiarity in the nerve tissue itself which inhibited nerve action. Lyman¹ has carried the argument one step farther, and has attempted to show that *artificial* sleep is the result of impregnating the brain with anæsthetic substances that interfere with sensibility, and, finally, produce stupefaction by hindering the normal processes of intramolecular oxidation in the protoplasm of nervous tissues. These are his words, but such speculations will be of little use to us in explaining morbid wakefulness, and whether or not the direct cause of sleep resides in a peculiarity of the nerve tissue itself, or in the changes of blood supply, it will be more important for us to cling to the indisputable facts observed and advanced by Mosso,² Burkhardt,³ Meynert,⁴ and others. Mosso proved, by direct observation, beyond the shadow of a doubt, that emotional or in-

¹ Lyman: *Insomnia, and other Disorders of Sleep*. Chicago, 1885.

² Mosso; Abstract of his article in *Brain*, vol. iv. p. 100.

³ Quoted by Meynert.

⁴ *Psychiatry*, cf. chapter on Nutrition of Brain.

tellectual activity increased the activity of cerebral circulation, and, which is an important fact for us, that there was a correspondingly deficient supply in other parts of the body, particularly in the extremities.¹ I shall have occasion to show that in several cases of very troublesome insomnia the peripheral circulation was seriously at fault.

Putting it broadly, sleep is a vasomotor affair; insomnia a vasomotor disturbance. But the rub comes in when we attempt to decide whether the vasomotor innervation of the cerebral bloodvessels is an extra-cerebral function, or whether there be not in the brain itself at least one, perhaps not the *only*, vasomotor regulator. If so, the trouble is worse confounded, and this inter-relation and interdependence of vasomotor and cerebral function seriously complicate matters. Many of us are, I think, hampered by the idea that the supply of blood is relatively and absolutely so plentiful in any one part or organ, that a change in the blood supply of that part or organ cannot seriously interfere with the blood supply of a distant organ. If the quantity of blood alone were to be considered, such changes would not be of serious import, but we must not forget that anæmia or hyperæmia of an organ has, or, I will say, may have an important influence upon pressure of circulation in other distant parts. At all events, I am not willing to believe that the conditions I have observed in several patients were entirely accidental, although the observations were

¹ Mosso, loc. cit., p. 105: "In sleep there occurs a dilatation of the vessels of the extremities which can be measured in the forearm by the plethosphymograph. It corresponds with a relaxation of the vascular walls. Every excitation from without causes a contraction of the vessels of the forearm and a subsequent increase of the blood pressure, causing a larger flow of blood to the brain."

made and noted at a time when I was not concerned with any theory on this head.

The case which I now relate will show what a fickle thing sleep is, and how it may be seriously influenced by apparently trivial causes.

A lady, aged forty, the mother of four children; married at a very early age, and has always had irregular menstruation, which very often is extremely scanty. The patient is a stout person with feeble pulse and cold extremities, who suffers by turns from sudden flushing of the face, light asthmatic attacks,¹ and occasional severe headaches. The patient is a lady of leisure, very much averse to severe physical exercise, and altogether too fond of a carriage. Heart sounds are weak, probably from deposit of fat about the heart; heart beat not intermittent; no audible murmurs. All abdominal and thoracic viscera healthy. Urine free from albumen and sugar. For the past ten years patient has had but the one serious trouble—insomnia. According to the account which was first given me, over two years ago, she had protracted spells of sleeplessness, during which time she would have great difficulty in falling asleep, and if she fell asleep, would at best sleep but one or two hours. This account is substantiated by the statements of her husband and of her maid. She had been thoroughly soaked with bromides, chloral, etc., with the result of procuring a few nights' good sleep, to be followed by many more of distressing insomnia. The time of menstruation was the most critical period. If the menstrual flow was free, sleep would be tolerably good; if the flow was scanty, insomnia would be certain to set in during the time of menstruation, and for at least eight or fourteen days to follow. In the course of the time that the patient has been under my treatment, I have had ample opportunity to verify this exact succession of events. During these periods of insomnia galvanism to head, lukewarm ablutions of the entire

¹ No evidence of gout in this case. Duckworth (*Brain*, vol. iv. p. 145) referred to asthmatic attacks in cases of gouty insomnia.

body before retiring, application of mustard to nape of neck and upper spine, the exhibition of urethan or paraldehyde: each agent would be followed by temporary relief, but no permanent cure was to be effected in this way. During the past few summers drinking the waters of Marienbad or Carlsbad, brought the greatest relief; and here sleep was induced, I am certain not so much by the effects of the water upon a mild form of chronic constipation, and the reduction of her superfluous adipose, as by the regular exercise she was compelled to take, and the bland diet she adhered to while under treatment at these places. As she returned to this city and again fell into her old habits, sleeplessness would return with unerring certainty. Like so many patients, this one cannot be impressed with the importance of obeying strict rules as to exercise and diet, and is much more deeply impressed by the exhibition of narcotic drugs.

No case that I have had has been so rebellious to treatment, and none has so deeply impressed me with the intimate relation existing between disturbances in peripheral circulation and the condition of insomnia. The irregularities of peripheral circulation are evidenced by the cold, clammy hands, the cold feet, and the scanty uterine flow at time of menstruation. It is not a difficult matter to produce a single or a few nights' sleep in patients even of this description, chloral, urethan, paraldehyde, hypnone each might bring this about; and, indeed, it is to be regretted that this is the case, for upon the withdrawal of these agents, the patient is, as a rule, much worse. You can in this way avoid an otherwise sleepless night, but you cannot and do not cure insomnia. To do this, you must strike at the root of the trouble, and endeavor to better the condition of the circulation.

If anæmia of the brain is conducive to sleep,¹

¹ A fact not wholly proved.

general anæmia is, on the other hand, a fruitful source of insomnia. These cases are so common that it appears quite superfluous to cite examples in support of this view. A short account of two will answer our purpose.

Mrs. R., æt. thirty-one; married twelve years; no children; has always been nervous, and is easily excitable, but there is no history of hysterical attacks of any sort. Considerable anæmia and very distressing palpitation, with occasional attacks of precordial fear at bed-time. Menstruation has always been irregular, occurring, as a rule, every five or six weeks. Constipation the rule. Is a great sufferer from headaches of the paralytic migraine type, and from insomnia. The two conditions are sometimes coincident, but not necessarily so. On tonic treatment with iron, gentian, and strychnia, the use of caffeine and ergot for the migraine, and, above all, by closely following out a prescribed regime as regards exercise and diet, the patient has been greatly relieved in the course of two months' treatment, and has been sleeping well for the last two months.

Another, and similar case, is that of Mrs. S. G., æt. forty, mother of four children, who, according to her own and husband's statement, has been a severe sufferer from insomnia and headaches for years. Every form of excitement, of which she has had not a little, would be followed by insomnia and headaches; during such periods she would sleep but an hour each night. Headaches, if present, would keep her awake, but when entirely free from these she spends many sleepless nights. The patient has been very much reduced in strength by chronic gastro-intestinal trouble, with alternate diarrhoea and constipation. Marked anæmia, no cardiac mischief, pulse weak but regular. Urine free from albumen, no sugar; but heavy deposits of urates. In this case, which is still under treatment, marked amelioration has been effected, first and foremost, I think, by the checking of the intestinal catarrh through the use of naphthalin, the pursuit of a non-irritating,

nutritious diet, with alkaline waters, and the taking of regular active exercise.

I do not wish to convey the impression that to my thinking all cases of insomnia have the same causation, and how mysterious the cause sometimes is, is frequently brought home to me by a patient whom I see every now and then, a man, *æt.* fifty-five, very thin, and slightly anæmic, a hard worker in his day, and now a man of leisure, who goes to bed regularly at eleven, to wake up again at two or two-thirty in the night, who then walks the floor until morning, or sits at the window in an arm-chair. For at least six years the man has passed every single night in this way. He does not sleep during the day, the functions of all his organs are perfect; his appetite fair, and his spirits surprisingly good. He was benefited for a time by nocturnal applications of galvanism to the head and by general faradization, but these soon lost their effect; every hypnotic is exciting, and one could scarcely prescribe a stricter diet, more exercise, and a more regular mode of life than he now observes.

From some of these cases I have just mentioned and a number of others, I have been led to recognize the intimate relationship between certain forms of headache and insomnia. In some headache and sleeplessness were coincident, in others there was an alternating relationship between the two conditions.

On looking over my cases of migraine associated with insomnia, I find that the migraine has been of the paralytic type, and that if sleep could by some means be secured the headache would disappear from that time onward. In cases of spastic migraine I have had patients complain of insomnia, but my notes do not show that this insomnia occurred at

or about the time of an attack of migraine. Here is a case in point.

F. M., æt. thirty-three, merchant, unmarried; fond of the good things in this world, but not given to troubling himself or exerting himself in any way, has been a sufferer from severe migraine ever since he was five years old. Attacks come on at irregular periods. My first acquaintance with the patient was during one of his attacks which was of a distinctly paralytic type—face flushed, pupils small, etc. These attacks are accompanied, as a rule, by sleeplessness, which the patient does not think is to be attributed to the severity of the headache. He had a rather bloated look at first, and was somewhat gluttonous in appearance.

I insisted on an entire change in his mode of life, compelled him to take active exercise, ride, swing dumb-bells, etc.; reduced his diet, and treated him with galvanization to the head. Patient has been free from migraine and insomnia for three months. Galvanism had a very pronounced influence for good upon his headaches, and his was one of those cases which do well under antipyrin. (I may say, incidentally, that, after two fifteen-grain doses of antipyrin, his headache disappeared, and he fell into a sleep lasting ten hours. I am not ready to pronounce antipyrin a hypnotic, but in insomnia associated with migraine I am inclined to think, from my experience in this and two other cases of paralytic migraine, that it kills two birds with one stone.)

I have had proof in still another way of this same relation: without any preconceived notions, except such as were suggested by the general condition of the individual patient, I find, on referring to my notes, that the same form of treatment which has been successful in a number of cases of insomnia has been successful in most of the cases of migraine with which I have had to cope. Until I have good reason to think otherwise, I shall for therapeutic

reasons look upon migraine and insomnia as vaso-motor disturbances.¹

As for the treatment of cases of functional insomnia, I would suggest, as the result of my experience with twenty-four recently treated cases² of functional insomnia, that if it be due to mental overwork, or other exhausting causes, these be first removed. Pronounced anæmia and general neurasthenic symptoms should be treated at once by the ordinary blood and spinal tonics; but, above all, every

¹ But is there any possibility or probability of determining the state of the cerebral circulation in these morbid states? While the appearance of pale or flushed face may permit a guarded inference respecting the state of the cerebral bloodvessels, it is by no means certain that flushed face means flushed brain. Careful examination of retinal bloodvessels might throw some light upon this point; but while writing this paper, I have received a reprint of an article by Eulenburg, of Berlin, in which another possible method of determining this question is suggested. Eulenburg has made accurate measurements of the resistance offered to the galvanic current by passing the same in a sagittal direction through the head. He determined the minimum of resistance in each case, and at each sitting, and was surprised to find that this minimum resistance varied but little, not only in the same individual, but in different individuals of the same age and condition of life. The average minimum of resistance in healthy persons was between 1200 and 1600 ohms. Marked departures from this average were noted in gross brain lesions, but still more distinctly in cases of severe functional disturbances—in hemicrania, anæmia, chorea, Basedow's disease, hystero-epilepsy, and the like. The increase or diminution of the minimum of resistance Eulenburg attributes to the variability of the quantity of blood within the skull. But the question is not settled yet; for although Eulenburg was able to state that the resistance of a given column of blood was twice as great as an equal volume of cerebro-spinal fluid, he found the resistance increased in those conditions of the brain in which there was presumably a reduction in the total quantity of blood present within the cranial cavity.

² Dispensary patients seem to be relatively free from insomnia. While the number of neurasthenics is great enough, they do not often complain of sleeplessness.

precaution should be taken to increase the force of the heart and of the whole circulatory apparatus; and that this cannot be done better in any way than by the use of cool douches to the head, chest, and spine; by prescribing a bland diet, together with some alkaline water, and by compelling the patient to take considerable outdoor exercise, either in the form of walking several hours each day, or of riding, rowing, bowling, and the like. During the summer months, mountain climbing, if not carried to excess, would be an admirable substitute for such exercise as we city people are at other times compelled to take.

The adoption of the rules laid down by Oertel would surely be followed by good results.

The substitution of passive for active exercise is, in my opinion, not sufficient, and incidentally I may remark that a patient who was otherwise doing well under a modified Weir Mitchell treatment was, during the greater part of the time, a great sufferer from insomnia.

After a few weeks of such treatment, I believe there will be marked improvement in many, if not in most cases of insomnia. But patients have an annoying way of wishing to obtain *prompt* relief, and obtaining this they become more tractable, and more amenable to every other form of treatment. It is on this account chiefly that we cannot dispense altogether with hypnotics, and must administer them occasionally in spite of ourselves.

Summarizing the experience I have had in the above cases of functional insomnia seen during the last year or more, I find that I have used for treatment chloral and bromide, the bromides separately, the amorphous hyoscyamine, paraldehyde,

urethan, and, in a single instance, hypnone. Morphine I have never used in these cases, as I object to it in all cases in which there is not severe pain, and certainly object to it in cases such as these when the patient would be quite prepared to contract the habit. The bromides alone have been of occasional service to me if given in one-half to one drachm doses, in cases of extreme restlessness, but even in these I have learnt to substitute the amorphous hyoscyamine in doses of about one-twentieth of a grain, repeated every three hours.

I object most strenuously to the plan advocated by Dr. W. A. Hammond and others, of keeping these patients for a long time under the influence of the bromides. These neurasthenic patients require all the will power they can possibly command, and are in much greater need of tonics than bromides. It is easy enough to bring about a condition of semistupor in such patients, but that is not equivalent to bringing about healthful sleep.

Paraldehyde I used freely about nine months ago, and for several months later. I gave it in doses of one to one and a half drachms in claret. This dose was always sufficient to bring about sleep the first few nights, but if required beyond this time, the drug proved unsatisfactory, as the hypnotic dose had to be increased, and, while I noticed no deleterious action upon the heart or other organs, the odor it imparted to the breath was excessively disagreeable. One female patient, whom I had not had occasion to see for some months, sent for me one morning after she had had a sleepless night. She had been using paraldehyde steadily in spite of my remonstrances, and I found, on entering, that the room was actually filled with the exhalation of paraldehyde.

Urethan has been satisfactory in a number of

cases. It has no disagreeable after-effects, and does not irritate either the stomach or bowels. It has been my experience that the dose should be between two and three grammes, and that greater quantities of Merck's preparation induce wakefulness rather than sleep.

The mixture of fifteen grains of bromide and twenty grains of chloral has often come to the rescue when every other hypnotic refused to act. I have seen no ill-effects follow the exhibition of this mixture, even in cases of weak heart.

A word as regards electrical treatment. In several cases in which no other remedy could secure relief, I have been able to induce sleep by galvanism applied to the head after the patient had retired for the night. I have given galvanism in the form of subaural, supposed sympathetic galvanization, and by passing currents directly through the head, with one pole on the nape of the neck, and the other on the forehead; changing cautiously the nature of the poles, and allowing the current to flow in an opposite direction, and never using a current of more than two milliampères. Occasionally I placed one pole over each temple. I have not been successful in the endeavor to bring on sleep by general faradization. Faradism to the head I would not apply under any circumstances. Moreover, so far as our present knowledge goes, galvanism is more effective than faradism in bringing about vasomotor changes.¹

¹ Since the reading of my paper an article covering this part of the subject has been published by Massey in this journal for May 7, 1887. It will be observed that my opinions differ in some respects from his. It is worth noting that in the discussion following the reading of my paper, the soporific effects of Franklinization were referred to by several speakers, thus corroborating by anticipation Dr. Massey's remarks.

If I have accomplished nothing else, I trust I have convinced some of you that in the treatment of these cases of neurasthenic insomnia, we are in need not so much of additional hypnotics, as of more effective means of regulating and influencing cerebral circulation.